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DC CONDUCTIVITY STUDIES IN LISAL04 AT INTERMEDIATE
TEMPERATURES AND ITS P (U) STANFORD UNIV CA DEPT OF
MATERIALS SCIENCE AND ENGINEERING

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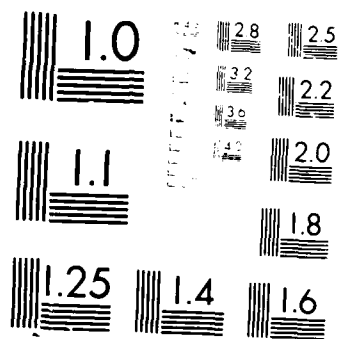
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DC Conductivity Studies in " Li_5AlO_4 " at Intermediate Temperatures
and Its Possible Application for the Electrolysis of Water

by

Steven Crouch-Baker, Lie-Yea Cheng and Robert A. Huggins

Extended Abstract for a Paper to Be Presented at the
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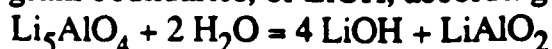
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DC CONDUCTIVITY STUDIES ON "Li₅AlO₄" AT INTERMEDIATE TEMPERATURES AND ITS POSSIBLE APPLICATION FOR THE ELECTROLYSIS OF WATER

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The ionic conductivity and thermal behaviour of Li₅AlO₄ have previously been studied in both wet and dry environments (1-3). The results of AC conductivity experiments indicated a large increase in the ionic conductivity of Li₅AlO₄ in a wet environment in the temperature range 415 - 450°C. Such behaviour was not observed in a dry environment. A similar increase was also found with pure LiOH, and it was suggested (2,3) that the observed conductivity increase in a wet environment is due to the formation, perhaps along grain boundaries, of LiOH, according to the reaction:



Recently, preliminary results concerning the DC conductivity of wet Li₅AlO₄ samples in an Ar atmosphere have been reported (4). These results were tentatively interpreted in terms of the transport of OH⁻ through the electrolyte, accompanied by the electrolytic decomposition of water vapor above approximately 1 V at 500°C. In this work, the DC conductivities of both wet and dry Li₅AlO₄ samples in various gaseous environments are reported. These results are interpreted in terms of both the electrode reactions which are possible at a given applied voltage and the thermodynamic properties of the Li-Al-O-H system (5). In addition, the possible application of the Li-Al-O-H system studied here to the problem of the electrolytic decomposition of water vapor at intermediate temperatures is discussed.

Acknowledgement

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